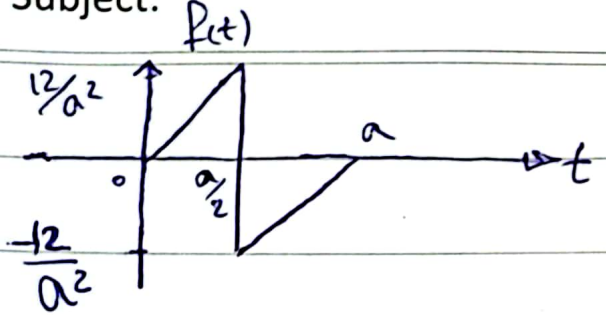
4011916 3 — [illegible]

Subject: Date:



شیب $m = \frac{12/a^2}{a/2} = \frac{24}{a^3}$ (1)

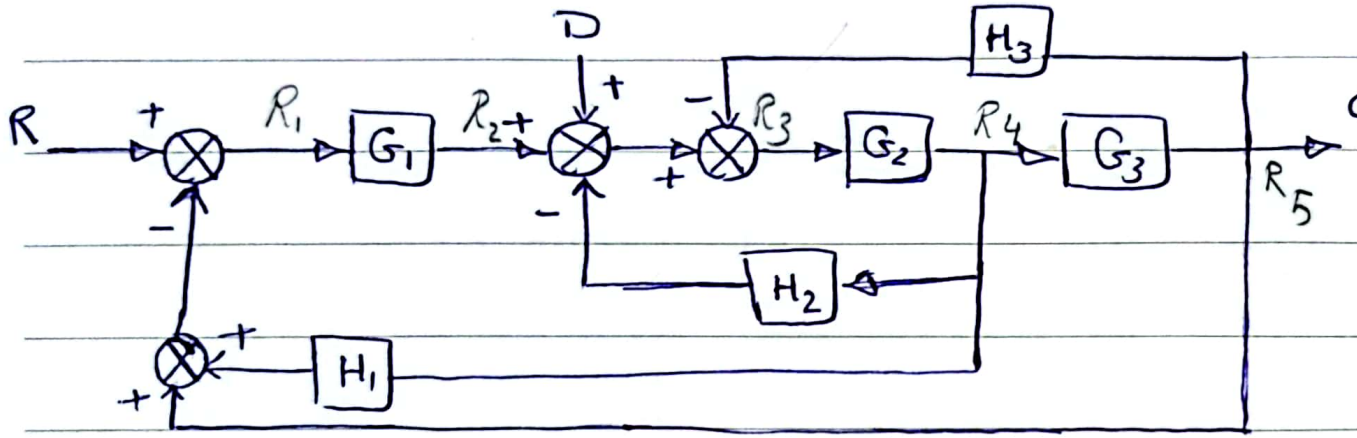
$$\mathcal{L}\{x(t)\} = \int_{-\infty}^{+\infty} x(t)e^{-st}dt \Rightarrow \mathcal{L}\{f(t)\} = \int_0^{a/2} \frac{24}{a^3}t \cdot e^{-st}dt + \int_{a/2}^{a} \left(\frac{24}{a^3}t - \frac{24}{a^2}\right)e^{-st}dt$$

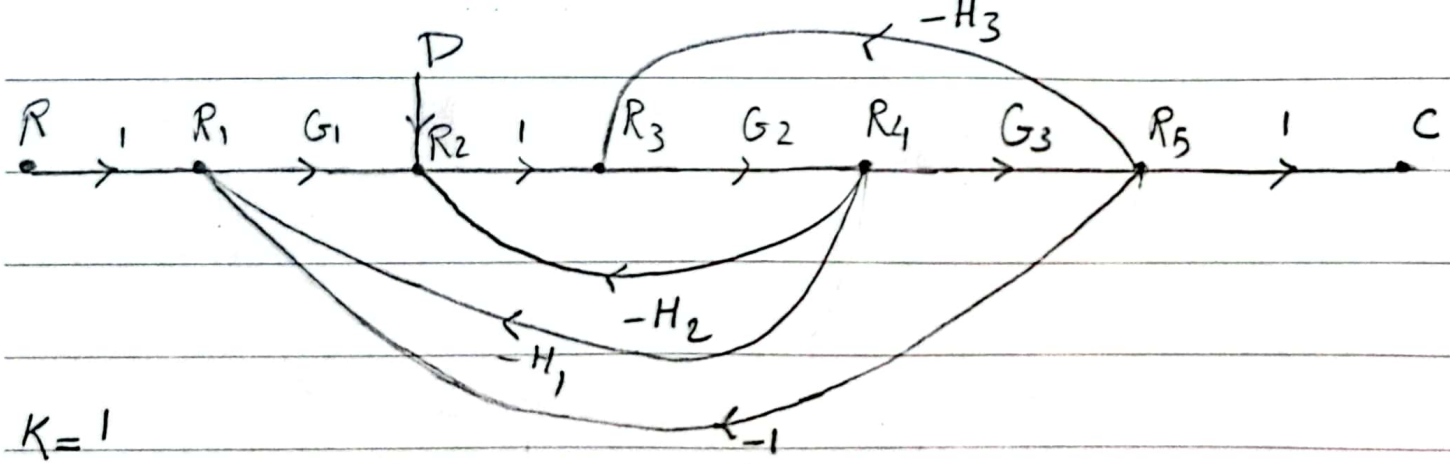
$$= \left[-\frac{1}{s}e^{-st}\left(\frac{24}{a^3}t\right) - \frac{1}{s^2}e^{-st}\left(\frac{24}{a^3}\right)\right]_0^{a/2} + \left[\left(\frac{24}{a^3}t - \frac{24}{a^2}\right)\left(-\frac{1}{s}e^{-st}\right) - \frac{24}{a^3}\left(\frac{e^{-st}}{s^2}\right)\right]_{a/2}^{a}$$

$$= \left(\frac{12}{a^2}\left(-\frac{1}{s}e^{-a/2s}\right) - \frac{24}{a^3s^2}e^{-a/2s}\right) + \frac{24}{a^3s^2} + \left(-\frac{24}{a^3s^2}e^{-as}\right) - \left(\frac{12}{a^2s}e^{-a/2s} - \frac{24}{a^3s^2}e^{-a/2s}\right)$$

$$= \frac{-12}{a^2s}e^{-a/2s} - \frac{24}{a^3s^2}e^{-a/2s} + \frac{24}{a^3s^2} - \frac{24}{a^3s^2}e^{-as} - \frac{12}{a^2s}e^{-a/2s} + \frac{24}{a^3s^2}e^{-a/2s}$$

$$= \frac{-24}{a^2s}e^{-a/2s} + \frac{24}{a^3s^2}(1 - e^{-as})$$





$K=1$

$M = G_1G_2G_3$, $L_{11} = -G_2H_2$, $L_{21} = -G_1G_2H_1$, $L_{31} = -G_1G_2G_3$, $L_{41} = -G_2G_3H_3$

$\Delta = 1-(L_{11}+L_{21}+L_{31}+L_{41})$

$\Delta_K = \Delta_1 = 1$

- حلقه با یکدیگر وجود ندارد
- همه حلقه ها با مسیر پیشرو در تماس هستند

الف) $M = \frac{y_o}{y_{in}} = \sum_{K=1}^{N} \frac{M_K \Delta_K}{\Delta} \Rightarrow \frac{C(s)}{R(s)} = \frac{G_1G_2G_3}{1-(L_{11}+L_{21}+L_{31}+L_{41})}$

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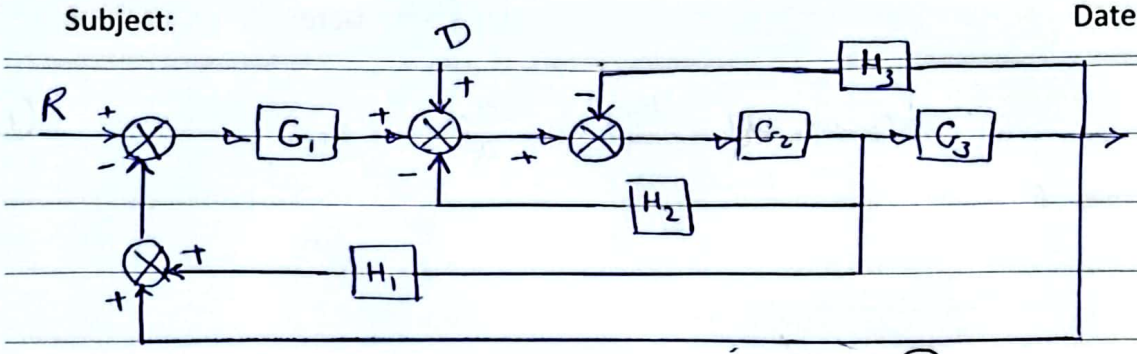
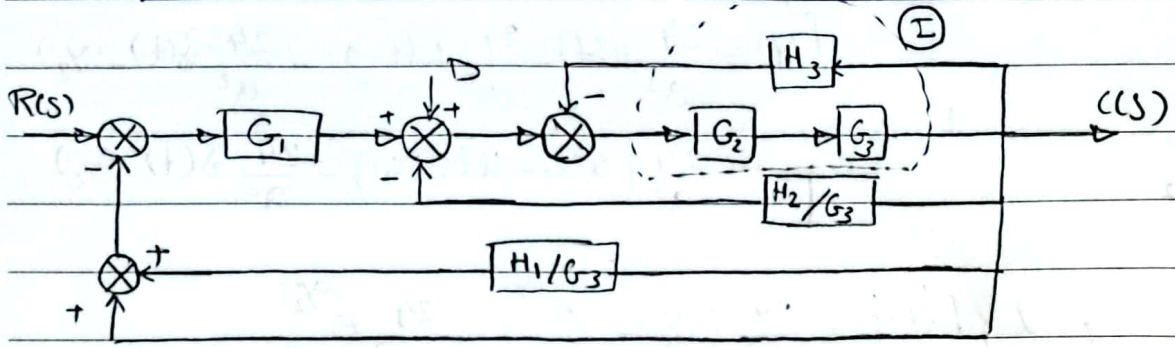
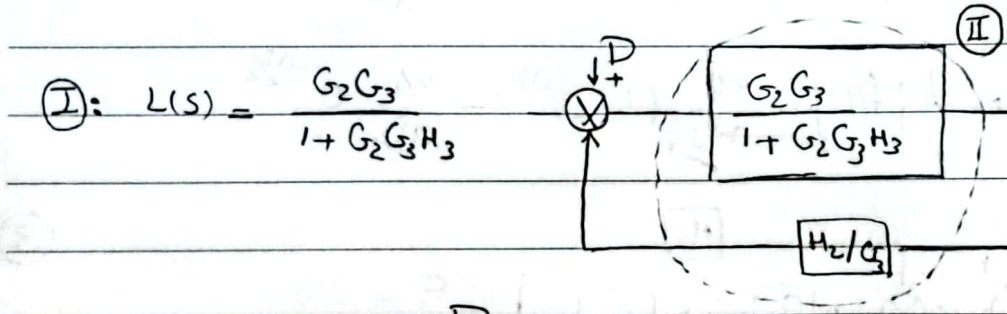


تمرین (3)

ساده سازی:

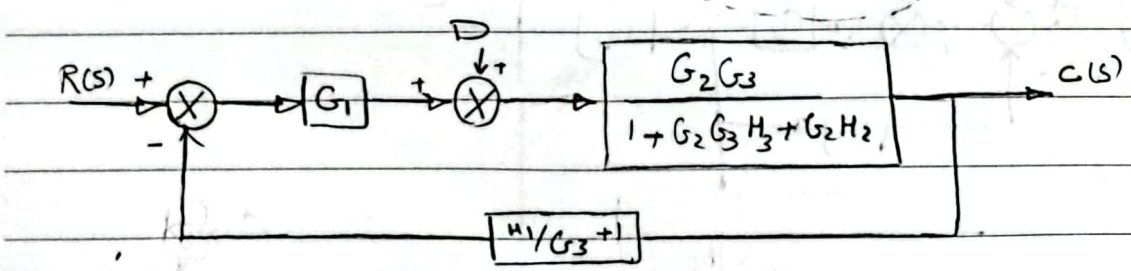




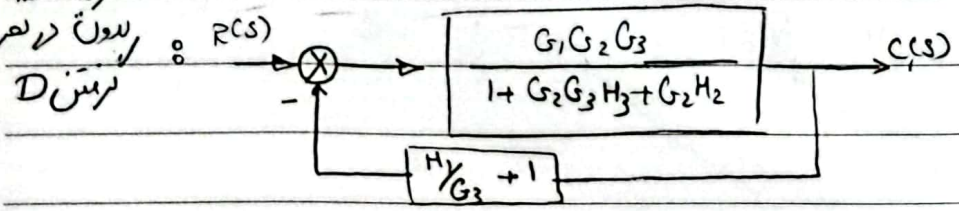
I: $L(S) = \dfrac{G_2G_3}{1+G_2G_3H_3}$

II $= \dfrac{\frac{G_2G_3}{1+G_2G_3H_3}}{1+\frac{H_2G_2}{(1+G_2G_3H_3)}}$

$= \dfrac{G_2G_3}{1+G_2G_3H_3+G_2H_2}$

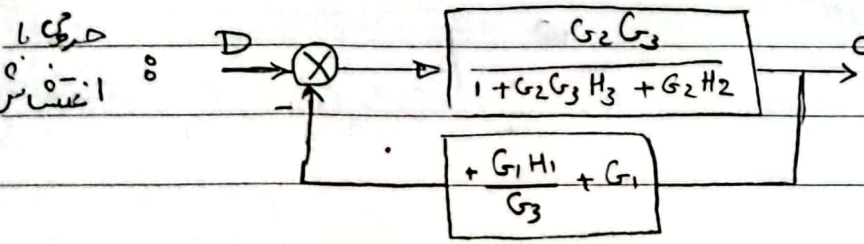


حرکتی بدون در نظر گرفتن D :



$$\frac{C_1(S)}{R(S)} = \frac{\frac{G_1G_2G_3}{1+G_2G_3H_3+G_2H_2}}{1+\left(1+\frac{H_1}{G_3}\right)\left(\frac{G_1G_2G_3}{1+G_2G_3H_3+G_2H_2}\right)}$$

حرکتی با اغتشاش :



$$\frac{C_D(S)}{D(S)} = \frac{\frac{G_2G_3}{1+G_2G_3H_3+G_2H_2}}{1+\frac{G_1H_1+G_1G_3}{G_3}\cdot\frac{G_2G_3}{1+G_2G_3H_3+G_2H_2}}$$

$$\frac{C(S)}{D} = \frac{G_2G_3}{1+G_2G_3H_3+G_2H_2+G_1G_2(H_1+G_3)} \neq 0 \Rightarrow G_3 \ll \left[\frac{1}{G_2}+G_3H_3+H_2+G_1(H_1+G_3)\right](\cdot$$

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KVL: $R_1 I(t) + X I(t) + V(t) = V_s(t)$

$J\ddot{\theta} + b\dot{\theta} + k\theta = \tau$

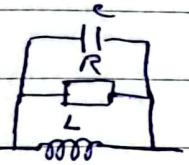
$\tau = k I(t)$

$\xrightarrow{\mathcal{L}}$

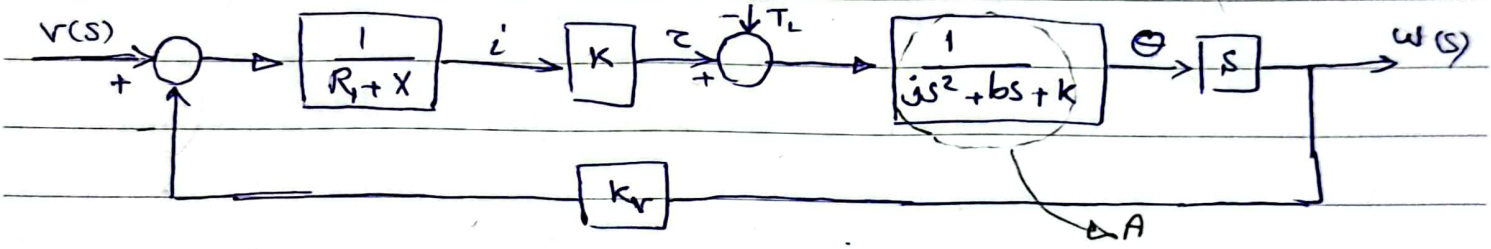
$R_1 I(s) + X I(s) + k_v \omega(s) = V_s(s)$ (2)

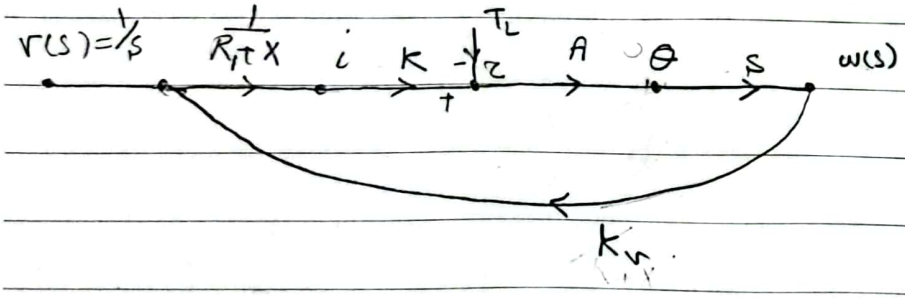
$Js^2\theta + bs\theta + k\theta = \tau$

$kI(s) = \tau$



X & $\frac{1}{X} = \frac{1}{LS} + \frac{1}{\frac{1}{CS}} + \frac{1}{R} \Rightarrow X = \frac{RLS}{RLCS^2 + LS + R}$





$M(S) = \frac{\theta}{V(S)}$ (I)

$M_k = M_1 = \frac{1}{S}\left(\frac{1}{R_1 + X}\right)(k)A$

$\Delta = 1 - \left(k_v \frac{1}{R_1 + X} kAS\right)$

$\Delta_K = 1$

$V_{in} = u(t) \Rightarrow V(S) = \frac{1}{S}$

$M(S) = \frac{\frac{1}{S}\left(\frac{kA}{R_1 + X}\right)}{1 - \frac{k_v kAS}{R_1 + X}} \overset{(I)}{=} \frac{\theta}{\frac{1}{S}} \Rightarrow \theta = \frac{kA}{R_1 + X - k_v kAS}$

$\Rightarrow \frac{\theta}{R_1} = \frac{kA/R_1}{R_1 + X - k_v kAS}$